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Subject: Fwd: An Overview of Java

very interesting article from Markoff yesterday.... praises Java and predicts that word processors and other apps will be written in Java to take advantage of the web/internet.

More data points on the Java phenomona: Computer Literacy's preprint of "Java!" from New Riders is reportedly attracting more attention than any other preprint in memory; their recent lecture on the topic at Sun's No. VA office attracted 300 people.

Sunil

Forwarded message:

Subj: An Overview of Java

Date: 95-09-25 18:38:51 EDT

From: DebbyB1

To: Fostergm,KSchoeler,DiamondRCC

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CC: SunilPaul,LCameron,THardart

FYI this excellent article from New York Times on the potential impact of Java. Sun may prove yet that Microsoft dominance is not a fait accompli.

09/25 MAKING THE PC COME ALIVE; A SOFTWARE LANGUAGE THAT PUTS YOU IN THE PICTURE

By JOHN MARKOFF

c.1995 N.Y. Times News Service

SAN FRANCISCO - At 3Com Park, a Giant batter hits a line drive through the hole and sprints toward first base. Simultaneously, an animation of the scene - with video-game realism - can be displayed on computer screens anywhere on the Internet.

``When he hits the ball, his batting average is updated in real time,`` explained Patrick Naughton, chief technology officer of Starwave Corp., an on-line provider of sports and other entertainment programming.

The demonstration, which can create similar on-line play-by-play of any major-league baseball game, was created by software developers at Starwave in Bellvue, Wash., using a new computer language known as Java - an emerging technology that many industry experts expect to be the next big thing in computing.

Just as popular World Wide Web ``browser`` software like Netscape have transformed the Web from a scientist's research tool into a consumer medium over the last two years, many computer industry researchers and executives predict that the Java programming language will transport the Web to the next level.

Currently, the Web, for all its multimedia marvels, which include text, images and even sound and video clips, is a fairly static medium. A computer user connected to the Internet can visit Web sites, but doing so is similar to watching the world through a store-front window.

Java essentially removes the glass from the window. It can serve simultaneously as a universal translator - enabling programs to move fluidly between incompatible operating systems - and as a go-fer.

With the help of a browser like Netscape, it can run across the Web and the rest of the Internet to fetch programs from the powerful computers that run Web sites and bring the programs and the information they generate (like the second-by-second account from the baseball game) back to a user's home computer.

Developed over the last four years by an elite team of software designers at Sun Microsystems led by James Gosling, and introduced to the market earlier this year, Java has burst into the already rapidly expanding commercial world of the Internet and the World Wide Web.

Other software developers are beginning to adopt Java, using it to create a new class of programs that leapfrog the walls that now keep many computers from interacting easily with each other. These programs could operate on any computer - whether a Windows, Macintosh or Unix machine - that a Java program encounters on the Internet.

Sun is a maker of computers and software using the industry-standard Unix software operating system, and the leading provider of so-called Internet server computers that act as the gateway through which most people's desktop computers actually send and receive data over the Net.

Figuring that what is good for the Internet is good for Sun, the company now hopes to turn Java into an industry standard by making it freely available to individuals and universities, while licensing it to companies that incorporate it into software products.

As a standard, Java could potentially transform the static universe of the Internet's World Wide Web into a computing ecology in which programs jump from one computer to another and do useful tasks - whether delivering the morning newspaper electronically without the user having to go look for it, performing automatic diagnosis and repair of computers from an online service center, or providing an interactive arena for elaborate multiplayer games.

"My computer has literally come alive," said Larry Smarr, the director of the National Center for Supercomputing in Urbana-Champaign, Ill., the Government-financed research center that originally developed Mosaic, the original World Wide Web browser on which Netscape is based. "This is the hottest thing on the Net."

The enthusiasm isn't limited to researchers. Advertising agencies are starting to look at Java as a way to cobble together little animated ads that people can easily download from the Web; a Coke ad, for example, might appear on the screen as a bottle cap, which when clicked with a computer mouse might turn into the cola-guzzling polar bear.

Lotus is said to be negotiating licensing rights with Sun to incorporate Java into an Internet version of its popular Lotus Notes program. Notes enables groups of people to work simultaneously on a single file over a computer network of Notes users. With Java embedded in Notes, that capability would extend to any computer on the Internet, and allow Notes users to run any Java program they receive.

And Netscape Communications Inc., whose browser software is the most popular way to navigate the World Wide Web, has already licensed rights to Java in hopes of continuing Netscape's role as an industry standard-setter.

Having Netscape aboard could give other software developers confidence to develop Java-based programs, knowing that millions of Netscape users will be able to run them.

Netscape, which was forced to acknowledge a potentially serious security flaw in its own software last week, might also benefit from Java's built-in security features, which are supposed to alert users of any intruders, viruses, Trojan horses or other network goblins that might crawl into their machines from the Internet.

``This is an elegant piece of work,'' said John Seeley Brown, a director of the Xerox Palo Alto Research Center, one of Silicon Valley's best-known computer laboratories. Brown's organization had nothing to do with Java's development - which makes his compliment all the more persuasive. ``Java could change the paradigm of everything - from newspapers to interactivity in the home,'' he said.

In the world of computer science, new programming languages are almost as common as graduate student dissertations. Only rarely, usually no more than once a decade, does a new language catch the attention of a sufficiently broad group of programmers to emerge as a potential standard.

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The last programming language to do so was Microsoft's Visual Basic, which was introduced in 1991. It was based on the decades-old Basic language and has evolved into a set of tools for software programmers - a so-called object-oriented approach that lets the creator use ready-made programming modules instead of writing lines and lines of code.

Some well known computer scientists even argue that Java, or a language very much like it, will eventually transform the computer industry by turning networks into a new technology platform - supplanting both the personal computer and PC operating system software as the foundation for a new market and new businesses that will grow as quickly as the PC software industry once did.

``The software industry is going to reinvent itself,'' said Geoffrey Fox, a professor of computer science and physics at Syracuse University and a pioneer in the field of parallel computing (in which tasks are broken up into small pieces for solving by dozens or even hundreds of computer processors working in parallel).

Not only will Web browsers like Netscape be updated for Java, Professor Fox predicts, but each major category of software application, like word processors and spread sheets, will be rewritten in Java to take advantage of the Web.

``Previously it was impossible to compete with Microsoft products like Word and Excel,'' he said, ``but now I see the World Wide Web leveling the playing field in the software industry.''

Java is based on the idea of ``distributed computing,'' in which a network of computers jointly process information and solve problems that otherwise would be the burden of a single machine. The distributed computing concept is not new.

As early as the mid-1970s scientists at places like Xerox PARC experimented with programs, called worms, that would automatically travel over a computer network between machines to do useful tasks.

But harnessing the technology has proven difficult. For one thing, accepting

unknown or unproven programs over a computer network is fraught with risk. One of the most infamous worms was created by Robert Tappan Morris, a Cornell University computer science student who unleashed a worm in 1988 as an experiment that wound up damaging more than 6,000 government, corporate and university computers on the Internet.

``We're playing with fire,'' said Brown at Xerox PARC. ``This is not something for mere mortals.``

Yet its Promethean possibilities are precisely why Java has been attracting such eager converts. Java appears to be the best attempt yet to strike a workable balance between security and functionality.

Java is known as an ``interpreted'' language, which means that each program that runs on the computer is examined and then executed, instruction by instruction, by the Java interpreter - a small software program known as an engine. The engine acts as a bouncer at the barroom door that will admit no visitor with the appearance of a trouble maker.

If the foreign program is admitted, the engine continually watches it to insure that it behaves itself and does not include any viruses, time bombs or secret back doors that could cause trouble later, even after the guest has been ushered out.

By handling security at this most basic level, Java is designed to permit small application programs called applets to flit back and forth between computers on a network, bearing skills as diverse as computer animation, real-time updates to newswires or stock-market tables, or multimedia advertisements.

It is also applets that would allow for collaborative computing among any computers on the World Wide Web, similar to the collaborative work that Lotus Notes currently enables users to perform on machines and corporate networks equipped with Notes.

Even though Java is designed to guard against the most common threats to network security, however, some computer researchers contend there is still no absolute solution - and that Java cannot protect computer users from themselves if they decide to forgo the safeguards built in to the language.

Besides viruses and worms that may prowl a network with malicious intent, another class of programs called Trojan horses can hide themselves in supposedly trusted applications. Java is supposed to be able to detect such attacks.

But if a user chose to ignore a security alert once the Trojan horse had been detected, and allowed the foreign program to run, Java could not protect the user's system from damage.

Some security experts predict that naive users will be lulled or conned into lowering their defenses - and suffering the consequences.

``There is no silver bullet,'' said Allan Schiffman, president of Terisa Systems, a Menlo Park, Calif., an Internet computer security firm. ``You can't expect to ever have a blanket solution to computer security.``